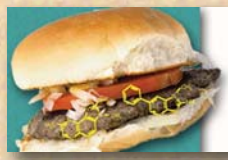
2006 LECTURE SERIES

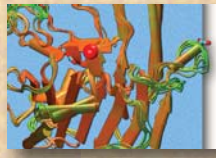
Presented By: Lawrence Livermore National Laboratory and Sigma Xi of Livermore

Science on Saturday (SOS) is a five-week series of free lectures and demonstrations targeted at middle and high school students. Presentations are aligned with the California Science Standards. Topics are selected from the forefront of science and technology research in a variety of disciplines.

March 4, 2006 — Waves in Nature: *Lasers to Tsunamis and Beyond*



March 11, 2006 — Diet and Cancer: *Are Cooked Meats Involved?*



March 18, 2006 — Life On Earth: *Instructions in Three Billion (tiny) Letters or Less*

March 25, 2006 — Climate Change: *What We Know and What We Need to Learn*

April 1, 2006 — Repairing DNA: *Our Best Defense Against Cancer*

All lectures are held at the Amador Theater located at 1155 Santa Rita Road, Pleasanton. Two presentations: 9:30 a.m. and 11:15 a.m. Seating is on a first come first serve basis and there is no pre-registration. Directions and map are available on the SOS website: http://education.llnl.gov/sos

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Lawrence Livermore National Laboratory

SCIENCE ON SATURDAY TOPICS AND PRESENTERS

WAVES IN NATURE: Lasers to Tsunamis and Beyond

Ed Moses *LLNL Scientist* **Rick Sawicki** *LLNL Scientist*

Dan Burns
Teacher, Los Gatos High School

Waves are in your life everyday and every way. Microwaves are waves, laser beams are waves, music is sound waves, tsunamis are water waves and the entire universe is filled with electromagnetic waves emanating from the Big Bang. Waves are sometimes useful and sometimes destructive. Microwaves cook our food and enable cell phone communication. The Indian Ocean Earthquake of 2004 demonstrated the devastating power that naturally occurring waves can generate. Lasers waves can generate enormous amounts of energy and power that behave in many ways similar to a tsunami. Fortunately, we know how to create and control them for the benefit of humankind. Come and learn about the similarities and difference in all of these wavy phenomena. We will have demonstrations and videos and audience participation. The world will never look the same to you again.

DIET AND CANCER: Are Cooked Meats Involved?

Mark Knize
LLNL Scientist

William J. Southam
Teacher, Castro Valley High School

Diet has been associated with differences in cancer rates in human populations for many years. However, causes of cancer associated with the diet have not been adequately explained.

This talk will present the latest research on cancer causes from atoms and molecules to experiments in humans. This "diet and cancer" project combines the traditional disciplines of biology, chemistry and physics to investigate a human health problem. Particular emphasis will be on work performed at LLNL investigating some interesting chemical products created when meat is cooked. We will also describe how lowering the cooking temperature, marinating meat, and turning the meat frequently reduces the formation of these compounds.

LIFE ON EARTH: Instructions in Three Billion (tiny) Letters or Less

Daniel Barsky
LLNL Scientist

Frankie Tate
Teacher, Granada High School

All life forms are written in a standard genetic code, unique to each species. By enormous technological feats, these codes have been revealed for hundreds of plants, animals, and microorganisms in just the past five years. The codes are available right now on the internet and everyone is invited to read them and try to understand them. Are you interested in medicine or psychology? Origins of life or the environment? Nano-scale machines? Life on other worlds? Many exciting areas of science are opening up because of the new genomic information. Do you want to study biology, chemistry, mathematics, physics, or computer science? Try learning all of them! The next generation of scientists will make spectacular new discoveries through truly interdisciplinary science.

CLIMATE CHANGE: What We Know and What We Need to Learn

Dave Bader
LLNL Scientist

Barry Marson
Teacher, Tokay High School

Is the Earth's climate changing? The answer is yes. The climate is changing continually; it always has and always will. The real questions are whether human activity is changing the climate in ways that nature did not intend and what are the consequences. Is global warming the cause of more frequent droughts, stronger storms and less snow in the mountains? In this lecture we will look at what scientists know about both natural and human-caused climate change and the research tools used to study the climate, such as satellites and computer models.

REPAIRING DNA: Our Best Defense Against Cancer

John Hinz *LLNL Scientist* **Salustra Urbin** *LLNL Scientist*

Kirk Brown
Teacher, Tracy High School

Cancer is the leading cause of death in the United States for people under the age of 85. It occurs when a single cell in the body stops performing its normal function and grows out of control. The instructions for normal cellular function are encoded in the DNA of a cell. Damage to DNA can lead to permanent changes, called mutations, which are the driving force for the loss proper cell instruction and subsequent cancerous growth. To prevent mutations, all cells of the human body have a series of specialized proteins that recognize and repair chemical and physical DNA damage. In this seminar, we will discuss the ways cells repair DNA, the mutagenic consequences of unrepaired DNA damage, and the fates of individuals born without DNA repair proteins.